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10/077,777	02/20/2002	Shigeki Matsuda	111995	3646
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/077,777	MATSUDA ET AL.
	Examiner Edna Wong	Art Unit 1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 05 September 2007.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-5 and 8-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-5 and 8-17 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. August 24, 2007.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

This is in response to the Amendment dated September 5, 2007. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Arguments

Claim Rejections - 35 USC § 112

Claims 2, 8, 13 and 14 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regards to claims 2, 13 and 14, the rejection under 35 U.S.C. 112, second paragraph, has been withdrawn in of Applicants' amendment.

With regards to claim 8, the rejection under 35 U.S.C. 112, second paragraph, is as applied in the Office Action dated April 5, 2007 and incorporated herein. The rejection has been maintained for the following reasons:

Claim 8

line 2, "the metal ions that form a complex with the phosphoric acid" lack antecedent basis. Claim 1, line 8, recites "metal ions that form a complex with the phosphate ions". Complexing with the phosphate ions is not the same as complexing with the phosphoric acid. Phosphoric acid is recited alone in claim 1.

Claim Rejections - 35 USC § 102/103

Claims **1-2 and 8** have been rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **EP 1,074,640 A1 ('640)**.

The rejection of claims 1-2 and 8 as applied in the Office Action dated April 5, 2007 has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 103

I. Claims **1-15** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Matsuda** (US Patent No. 5,645,706).

The rejection of claims 1-15 under 35 U.S.C. 103(a) as being unpatentable over Matsuda has been withdrawn in view of Applicants' amendment.

II. Claims **3-6 and 9-15** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **EP 1,074,640 A1 ('640)** as applied to claims 1-2 and 8 above, and further in view of **Matsuda** (US Patent No. 5,645,706).

The rejection of claims 3-6 and 9-15 under 35 U.S.C. 103(a) as being unpatentable over EP 1,074,640 A1 ('640) as applied to claims 1-2 and 8 above, and further in view of Matsuda has been withdrawn in view of Applicants' amendment.

Response to Amendment

Claim Objections

Claims 1 and 3 are objected to because of the following informalities:

Claim 1

line 6, is “said metal material article having electrical conductivity” the same as the metal material article to be treated as recited Claim 1, line 3? If not, then what is the relationship between the metal material article having electrical conductivity and the metal material article to be treated.

Claim 3

line 6, it is suggested that the word “maintain” be amended to the word -- maintaining --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

I. Claims 1-5 and 8-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1

line 19, recites "NO₂ and/or N₂O₄ gas is substantially separated from the treatment bath".

Applicants' specification, pages 1-44, does not mention that NO₂ and/or N₂O₄ gas is substantially separated from the treatment bath. Thus, there is insufficient written description to inform a skilled artisan that applicant was in possession of the claimed invention as a whole at the time the application was filed.

However, there is sufficient written description for "removes gases" (page 9, line 20); "separating NO, NO₂, and/or N₂O₄ gas formed in the treatment bath" (page 9, lines 30-31); "removing gases in the form of nitrogen oxides present in the treatment liquid" (page 10, lines 8-9); "this gas is removed from the treatment bath" (page 15, line 31); "the gas is removed from the treatment bath" (page 16, line 2); "or become a gas and removed from the solution" (page 20, lines 25-26); "the ease of removal of these gases from the treatment bath" (page 21, lines 18-19); "NO₂, N₂O₄ and/or NO gas generated and dissolved in the electrolytic treatment tank is removed" (page 27, lines 10-12); "dissolved gases can easily escape from solution" (page 27, lines 28-29); "escape of gases" (page 28, line 1); "the aggregated gases are rapidly released into the atmosphere" (page 28, lines 11-12); "removal of gas" (page 28, line 20); and "removal of NO_x gas" (page 43, line 22).

The Examiner has carefully considered the entire specification as originally filed, however, there is found no literal support in the specification for the newly added

limitations in amend claim 1. Applicants have not provided the page number and line numbers from the specification as to where the newly added limitations are coming from. *Ex parte Grasselli*, 231 USPQ 393 (Bd. App. 1983) *aff'd mem.* 738 F.2d 453 (Fed. Cir. 1984).

II. Claims 1-5 and 8-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

line 16, "the amount of Fe ions" lack antecedent basis. Claims 1, line 16, recites "Fe".

Furthermore, what is the relationship between the Fe ions and the metal ions that form a complex with the phosphate ions (from claim 1, line 8)? What is the relationship between the Fe ions and the metal ions for which the dissolution-precipitation equilibrium potential at which the metal ions dissolved in said phosphate chemical treatment bath are reduced and precipitate as metal (from claim 1, lines 9-11)? Are the amount of Fe ions further limiting one of these metal ions?

line 18, it appears that "a metal material article to be treated of a steel material" is further limiting the metal material article to be treated recited in claim 1, line 3. However, it is unclear if it is. If it is not, then what is the relationship between the metal material

article to be treated of a steel material and the metal material article to be treated? Are there two metal material articles used in the method?

line 21, it appears that “a standard hydrogen electrode” is the same as the hydrogen standard electrode recited in claim 1, line 12. However, it is unclear if it is. If it is not, then what is the relationship between the standard hydrogen electrode and the hydrogen standard electrode? Are there two standard hydrogen electrodes used in the method?

Claim 2

lines 2-3, it appears that “an electrode material that dissolves in the treatment bath” is the same as the Fe electrode or a metal material article to be treated of a steel material recited in claim 1, lines 17-18. However, it is unclear if it is. If it is not, then what is the relationship between the electrode material that dissolves in the treatment bath and the Fe electrode or a metal material article to be treated of a steel material?

lines 3-4, “the metal ions that form a complex with the phosphoric acid” lack antecedent basis. Claim 1, line 8, recites “metal ions that form a complex with the phosphate ions”. Complexing with the phosphate ions is not the same as complexing with the phosphoric acid. Phosphoric acid is recited alone in claim 1.

Claim 3

line 2, recites "dissolving an amount of Fe ions into the treatment bath". Claim 1, lines 16-17, recites "the amount of Fe ions dissolved into the treatment bath". Are these amounts of dissolved Fe ions the same? If not, then what is their relationship? Are there two amounts of Fe ions dissolved in the treatment bath?

line 2, it appears that "an amount of Fe ions" is the same as the amount of Fe ions recited in claim 1, line 16. However, it is unclear if it is. If it is not, then what is the relationship between the amounts of Fe ions? Are there two amounts of Fe ions dissolved in the treatment bath?

line 6, "greater than 800 mV" lacks antecedent basis. Claim 1, line 22, recites "770 mV to 960 mV". The scope of "greater than 800 mV" goes beyond the maximum of 960 mV set in claim 1.

Claim 4

line 3, recites "dissolving an amount of Fe ions into the treatment bath". Claim 1, lines 16-17, recites "the amount of Fe ions dissolved into the treatment bath". Are these amounts of dissolved Fe ions the same? If not, then what is their relationship? Are there two amounts of Fe ions dissolved in the treatment bath?

line 3, it appears that "an amount of Fe ions" is the same as the amount of Fe ions recited in claim 1, line 16. However, it is unclear if it is. If it is not, then what is the relationship between the amounts of Fe ions? Are there two amounts of Fe ions dissolved in the treatment bath?

line 7, "greater than 770 mV" lacks antecedent basis. Claim 1, line 22, recites "770 mV to 960 mV". The scope of "greater than 770 mV" goes beyond the maximum of 960 mV set in claim 1.

Claim 5

line 2, recites "an electrode". Claim 1, lines 17-18, recite "a Fe electrode". Are these electrodes the same? If not, then what is their relationship?

lines 2-3, "the ORP of the phosphate chemical treatment bath equal to or greater than 770 mV" lacks antecedent basis.

Claim 9

lines 4-5, it appears that the "electrolytic treatment" is the same as the electrolytic treatment recited in claim 1, line 5. However, it is unclear is. If it is, then it is suggested that the word -- the -- be inserted after the word "out". If is it is not, then what is the electrolytic treatment referring to? Are there two separate, independent electrolytic

treatments being carried out (one electrolytic treatment carried out in claim 1 and one electrolytic treatment carried out in claim 9)?

lines 5-6, it appears that the "electrolytic treatment" is the same as the electrolytic treatment recited in claim 9, lines 4-5. However, it is unclear is. If it is, then it is suggested that the word -- the -- be inserted after the word "out". If is it is not, then what is the electrolytic treatment referring to? Are there three separate, independent electrolytic treatments being carried out (one electrolytic treatment carried out in claim 1 and two electrolytic treatments carried out in claim 9)?

Claim 13

line 4, recites "exposing the removed treatment liquid to the atmosphere". Claim 17, lines 4-5, recites "exposing the treatment liquid to the atmosphere". Are there two separate, independent exposing steps being carried out in the method? If not, then what is their relationship?

lines 5-6, recite "separating NO₂ and N₂O₄". Claim 17, line 2, recites "separating NO₂ and/or N₂O₄ gas". Claim 1, line 19, recites "NO₂ and/or N₂O₄ gas is substantially separated". Are there three separate, independent separating steps being carried out in the method? Are all of the NO₂ and N₂O₄ the same? If not, then what is their relationship?

Claim 14

line 3, "greater than 800 mV" lacks antecedent basis. Claim 1, line 22, recites "770 mV to 960 mV". The scope of "greater than 800 mV" goes beyond the maximum of 960 mV set in claim 1.

Claim 17

line 2, recites "separating NO₂ and/or N₂O₄ gas". Claim 1, line 19, recites "NO₂ and/or N₂O₄ gas is substantially separated". Are these separating steps the same? Are the NO₂ and N₂O₄ gases the same? If not, then what is their relationship?

Claim Rejections - 35 USC § 103

Claims 1-5 and 8-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1,074,640 A1 ('640) in combination with Matsuda (US Patent No. 5,645,706).

EP '640 teaches an electrolytic phosphate chemical treatment method of forming a film composed of a phosphate compound and a metal that is reduced and precipitated from an ionic state (= becomes phosphate (e.g., Zn₂Fe(PO₄)₃), which in turn becomes the film) [page 20, [0191]] on the surface of a metal material article to be treated (= iron (steel material)) [page 15, line 11], comprising:

performing the electrolytic treatment on said article 2 to be treated in a phosphate chemical treatment bath 1 by contacting said metal material article having electrical conductivity with said phosphate chemical treatment bath containing:

(i) phosphate ions,
(ii) phosphoric acid,
(iii) nitrate ions,
(iv) metal ions that form a complex with phosphate ions in said phosphate chemical treatment bath, and
(v) metal ions for which the dissolution-precipitation equilibrium potential at which the metal ions dissolved in said phosphate chemical treatment bath are reduced and precipitate as metal is equal to or greater than -830 mV, which is the cathodic reaction decomposition potential of water when indicated as the hydrogen standard electrode potential (page 6, [0041]; and page 21, [0209]), wherein

the treatment bath has a pH of less than 2 (= a pH of 0.5-5.0) [page 20, [0189]]; page 22, [0218]; and page 24, Table 5] and is substantially free of metal ions (= the phosphate chemical treatment bath is composed so that the concentration of ions, such as Na ions, not involved in the film formation reaction, which are metal ions other than the film components, in the phosphate chemical treatment bath, is 400 ppm or less), other than those which are a component of the film which will form sludge (= as a result, the stability of the treatment bath as a solution is improved considerably resulting in a composition that does not form a sludge) [page 11, [0101] and [0110]]; Fe is present (= becomes phosphate (e.g., $Zn_2Fe(PO_4)_3$), which in turn becomes the film) [page 20, [0191]] and the amount of Fe ions dissolved in the treatment bath is

from a Fe electrode (= **Fe** is used for the film-forming metal electrode (**anode**) or a metal article to be treated of a steel material (= iron (steel material)) [page 12, [0120] to [0122]; page 13, Table 3; and page 15, [0143], and Table 4];

NO_2 and/or N_2O_4 gas is substantially separated from the treatment bath (= unavoidably formed reaction products (sludge) and **nitrides** (such as NO_2) **formed by reduction of nitrate ion** other than on the surface of the article to be treated by electrolysis reaction can be **removed** from the treatment bath) [page 9, [0076]]; and

the oxidation-reduction potential (ORP) of said phosphate chemical treatment bath indicated as the potential relative to a standard hydrogen electrode is maintained at 770 mV to 960 mV (= 200-1000 mV) [page 24, Table 5], and is used to monitor the treatment bath (= the ORP of the treatment bath reflects the composition of the treatment bath) [page 19, [0179]; and page 22, [0219]].

The electrolytic treatment uses for an electrode material that dissolves in the treatment bath ¹the metal ions that forms a complex with the phosphoric acid and the phosphate ions in the phosphate chemical treatment bath (= a working electrode ³ comprised of a metal material that forms a complex with phosphate in the phosphate chemical treatment bath) [page 19, [0176]; and Table 3], ²the metal material article from which the dissolution-precipitation equilibrium potential at which the metal ions dissolve in the phosphate chemical treatment bath are reduced and precipitate as the metal is greater than or equal to -830 mV, which is the cathodic reaction decomposition potential of water when indicated as the hydrogen standard electrode potential (= a working

electrode 4 comprised of a metal material for which the electrical potential at which ions dissolve in the phosphate chemical treatment bath are reduced and precipitate as metal is equal to or greater than the anodic electrolytic reaction potential of water as the solvent or greater than or equal to -0.83 V (indicated as the hydrogen standard electrode potential)) [page 19, [0176]; and Fig. 3], or ³a metal material that is insoluble during the electrolytic treatment (page 13, [0124]; and Table 3).

The metal ions that form a complex with the phosphoric acid and the phosphate ions in the phosphate chemical treatment bath are at least one of Zn, Fe, or Mn ions (page 8, [0070]).

The oxidation-reduction potential of the treatment bath is equal to or greater than 800 mV (= 200-1000 mV) [page 24, Table 5].

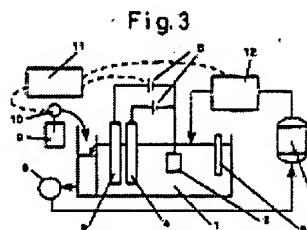
The treatment bath is maintained in a constant state (= stability) by measuring an oxidation-reduction potential value of the treatment bath and changing an amount and/or composition of replenishing chemical corresponding to the change in that value (= a control computer 11 for controlling the amount of replenishing chemical added, the applied voltage and so forth based on information from sensor 12 that measures the pH, the ORP and other parameters of the treatment bath) [page 19, [0179]].

The ORP of said phosphate chemical treatment bath is maintained at 800 mV to 960 mV (= 200-1000 mV) [page 24, Table 5].

Separating the NO₂ and/or N₂O₄ gas from the treatment bath (page 9, [0074] to [0076]) comprises circulating treatment liquid of the treatment bath 1 via a circulation

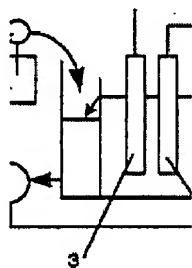
system which circulates the treatment liquid under pressure using a pump 6 (= a filtration/circulation pump) from a treatment tank to the same (Fig. 3).

The circulation system is provided by separating the treatment tank into an electrolytic treatment tank that carries out electrolytic treatment and an auxiliary tank that does not carry out electrolytic treatment and circulating the treatment liquid of the



treatment bath between the two tanks (=) [page 19, [0175] to [0180]].

The auxiliary tank that does not carry out the electrolytic treatment has a mechanism in which the treatment liquid is passed through a permeably solid structure

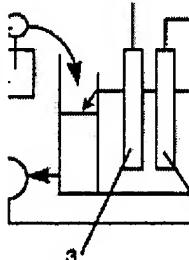


(=) [page 19, [0175] to [0180]].

A filter 7 having a mechanism that filters the treatment liquid is used for the auxiliary tank that does not carry out the electrolytic treatment (page 19, [0177]).

The electrolytic phosphate chemical treatment method further comprises removing, through a liquid circulation circuit, a portion of the treatment liquid at a

location prior to being introduced into a filter material in a filter 7, exposing the removed



treatment liquid to the atmosphere (=) [page 19, [0175] to [0180]], and returning it to the electrolytic treatment tank after separating NO_2 and N_2O_4 present in the treatment liquid (page 9, [[0074] to [0076]).

The oxidation-reduction potential of the treatment bath is equal to or greater than 800 mV (= 200-1000 mV) [page 24, Table 5].

The ORP of said phosphate chemical treatment bath is maintained at 800 mV to 960 mV (= 200-1000 mV) [page 24, Table 5].

The method of EP '640 differs from the instant invention because EP '640 does not disclose the following:

a. Wherein the amount of Fe ions dissolved in the treatment bath is controlled by changes in the amount of Fe ions dissolved into the treatment bath, as recited in claim 1.

EP '640 teaches that in the case of using "metal materials that dissolve and precipitate easily and become film components (such as Fe, Zn or Cu)" of Table 3 for the **anode**, those metals dissolve easily in the phosphate chemical treatment bath even if voltage is not applied (even in the absence of electrolysis). If this phenomenon

(action) is left undisturbed, these metal ions dissolve in the treatment bath even when treatment is not performed. As a result, the state of the treatment bath ends up changing to a state that does not allow treatment to be performed. Consequently there is a need to provide a means for inhibiting that dissolution (page 13, [0129] to page 13, [0130]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the amount of Fe ions dissolved in the treatment bath described by EP '640 with wherein the amount of Fe ions dissolved in the treatment bath is controlled by changes in the amount of Fe ions dissolved into the treatment bath because Fe would have dissolved easily in the phosphate chemical treatment bath even if voltage is not applied (even in the absence of electrolysis). If this phenomenon (action) was left undisturbed, these metal ions would have dissolved in the treatment bath even when treatment was not performed. As a result, the state of the treatment bath would have ended up changing to a state that did not allow treatment to be performed as taught by EP '640 (page 13, [0129] to page 13, [0130]).

b. Dissolving an amount of Fe ions into the treatment bath in order to make said ORP of the phosphate chemical treatment bath equal to or greater than 800 mV and maintaining the amount of Fe ions within a solubility limit of Fe^{3+} ions, as recited in claim 3.

c. Dissolving an amount of Fe ions that dissolves in the treatment bath so

that the ORP of the phosphate chemical treatment bath is equal to or greater than 770 mV, as recited in claim 4.

EP '640 teaches that Fe ions cannot exist in solution as ferrous ion (Fe^{2+}) but only as ferric ion (Fe^{3+}) and the ferric ions have strong coagulating properties that result in the formation of sludge when added to the treatment bath (page 21, [0203]).

Like EP '640, **Matsuda** teaches a phosphate chemical treatment by electrolysis (col. 10, lines 5-7). Matsuda teaches that Fe^{3+} is stably present in the bath with an ORP of 560 mV or greater (col. 13, lines 55-58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the amount of Fe ions dissolved in the treatment bath described by EP '640 by dissolving an amount of Fe ions into the treatment bath in order to make said ORP of the phosphate chemical treatment bath equal to or greater than 800 mV and maintaining the amount of Fe ions within a solubility limit of Fe^{3+} ions; and by dissolving an amount of Fe ions that dissolves in the treatment bath so that the ORP of the phosphate chemical treatment bath is equal to or greater than 770 mV because ferric ions have strong coagulating properties. Dissolving an amount of Fe ions into the treatment bath in order to make said ORP of the phosphate chemical treatment bath equal to or greater than 800 mV and maintaining the amount of Fe ions within a solubility limit of Fe^{3+} ions and dissolving an amount of Fe ions that dissolves in the treatment bath so that the ORP of the phosphate chemical treatment bath is equal to or greater than 770 mV would have had Fe^{3+} stable in the bath because Fe^{3+} is stably

present in the bath with an ORP of 560 mV or greater as taught by Matsuda (col. 13, lines 55-58).

d. Wherein an electrode is used in the electrolytic treatment for making the ORP of the phosphate chemical treatment bath equal to or greater than 770 mV is an insoluble metal material, as recited in claim 5.

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because EP '640 teaches that an electrode that is used in the electrolytic treatment is an insoluble metal material (= Ni or other insoluble materials) [page 12, [0120] to [0122]; and page 13, Table 3].

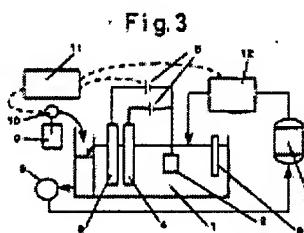
As to the claim limitation of "for making the ORP of the phosphate chemical treatment bath equal to or greater than 770 mV", the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

e. Exposing the treatment liquid to the atmosphere in the circulation system, so that dissolved NO₂ and/or N₂O₄ gas can easily escape from the treatment liquid, as

recited in claim 17.

f. Removing, through a liquid circulation circuit, a portion of the treatment liquid at a location prior to being introduced into a filter material in a filter, exposing the removed treatment liquid to the atmosphere, and returning it to the electrolytic treatment tank after separating NO₂ and N₂O₄ present in the treatment liquid, as recited in claim 13.

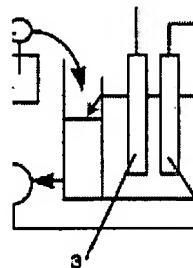
The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because EP '640 teaches:



EP '640 teaches that it is preferable to remove a portion of the phosphate chemical treatment bath from a bath tank having the phosphate chemical treatment bath, to thermodynamically stabilize the energy state of the portion as a liquid, of the phosphate chemical treatment bath, and to later return it to the bath tank (page 9, [0074]).

EP '640 teaches that a filtration/circulation pump 6 for removing a portion of the phosphate chemical treatment bath 1 from inside the bath tank (page 19, [0177]). A filter 7 removes solids that have precipitated in the phosphate chemical treatment bath 1 during the course of the film formation reaction (page 19, [0177]).

EP '640 shows the phosphate chemical treatment bath 1 passing through a solid structure into the auxiliary tank (Fig. 3):

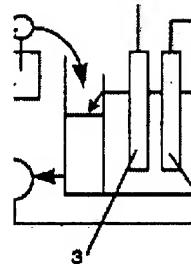


Dissolved NO₂ and/or N₂O₄ gas would have easily escape from the treatment liquid in this structure because the structure is open to the atmosphere.

g. Wherein the solid structure is a film, as recited in claim 11.

EP '640 teaches that it is preferable to remove a portion of the phosphate chemical treatment bath from the bath tank having the phosphate chemical treatment bath, and remove the solids that precipitated during phosphate chemical treatment during the course of the film formation reaction, followed by returning it to the bath tank (page 9, [0075]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified solid structure described by EP '640 with wherein the solid structure is a film because permeable thin film membranes are conventionally used to partition processing tanks. EP '640 shows the phosphate chemical treatment bath 1 passing through a solid structure into the auxiliary tank (Fig. 3):



RE: REMARKS

Applicants state that nowhere does '640 disclose prohibiting the formation of excess Fe^{3+} , thereby prohibiting non-film forming reactions.

In response, EP '640 teaches that Fe ions cannot exist in solution as ferrous ion (Fe^{2+}) but only as ferric ion (Fe^{3+}) and the ferric ions have strong coagulating properties that result in the formation of sludge when added to the treatment bath (page 21, [0203]).

From this teaching, one having ordinary skill in the art would have prohibited the formation of excess Fe^{3+} because ferric ions have strong coagulating properties that result in the formation of sludge.

Applicants state that '640 nowhere discloses substantially separating NO_2 and N_2O_4 from the treatment bath.

In response, EP '640 teaches that unavoidably formed reaction products (sludge) and ***nitrides*** (such as NO_2) ***formed by reduction of nitrate ion*** other than on the surface of the article to be treated by electrolysis reaction can be ***removed*** from the

treatment bath) [page 9, [0076]].

Applicants state that '640 teaches directly away from the claimed pH and ORP, and nowhere discloses or suggests the claimed specific combination of pH and ORP values, in combination with 1) separating NO_2 and N_2O_4 from the treatment bath, and 2) replenishing the Fe ions. Hence, '640 clearly nowhere discloses, inherently or expressly, the combination of the features or advantages of instant claim 1.

In response, EP '640 teaches a pH of 0.5-5.0 (page 20, [0189]) and an ORP of 200-1000 mV (page 24, Table 5). In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists (MPEP § 2144.05(I)).

EP '640 teaches that unavoidably formed reaction products (sludge) and ***nitrides*** (such as NO_2) ***formed by reduction of nitrate ion*** other than on the surface of the article to be treated by electrolysis reaction can be ***removed*** from the treatment bath) [page 9, [0076]].

Matsuda teaches replenishing the Fe ions. Matsuda teaches that since at an ORP of 560 mV or greater the treatment bath contains paramagnetic ion (Fe^{3+}), the following points must be considered regarding *the circulation cycle*, in order to maintain the treatment bath at an ORP of 560 mV or greater. That is, the magnetic field must not be allowed to influence the circulation cycle. If the magnetic field acts on the treatment bath, then it will affect the paramagnetic components (Fe^{3+}), *and as a result the Fe^{3+} will*

dissolve in the treatment bath(s) and disappear, leaving no Fe³⁺ in the treatment bath(s). Consequently, the ORP will by necessity fall below 560 mV (col. 29, lines 34-47).

Applicants state that '640 fails to teach controlling the amount of Fe ions dissolved in the treatment bath as required by claim 1.

In response, EP '640 teaches that in the case of using "metal materials that dissolve and precipitate easily and become film components (such as Fe, Zn or Cu)" of Table 3 for the **anode**, those metals dissolve easily in the phosphate chemical treatment bath even if voltage is not applied (even in the absence of electrolysis). If this phenomenon (action) is left undisturbed, these metal ions dissolve in the treatment bath even when treatment is not performed. As a result, the state of the treatment bath ends up changing to a state that does not allow treatment to be performed. Consequently there is a need to provide a means for inhibiting that dissolution (page 13, [0129] to page 13, [0130]).

Applicants state that Matsuda is entirely different, as an *electroless* system, than the claimed *electrolytic* system.

In response, Matsuda teaches the electrolytic chemical treatment method in the transparent treatment bath according to his invention and *the non-electrolytic chemical treatment method according to the prior art* (col. 29, lines 10-36).

A more detailed explanation regarding the method of electrolysis by which his invention is characterized begins on col. 10, lines 5-7.

Matsuda teaches an electrolytic system.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

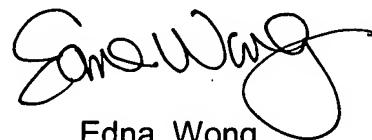
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Edna Wong
Primary Examiner
Art Unit 1753

EW
September 25, 2007